

American Museum Novitates

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY
CENTRAL PARK WEST AT 79TH STREET, NEW YORK 24, N.Y.

NUMBER 2083

MAY 15, 1962

Myxomycetes from Shades State Park and Pine Hills Natural Area, Indiana

BY GEORGE WILLARD MARTIN¹ AND JACK MCCORMICK²

Shades State Park and Pine Hills Natural Area (owned by Nature Conservancy)³ are adjoining properties located on Sugar Creek in west-central Indiana approximately 50 miles west-northwest of Indianapolis and 125 miles south-southeast of Chicago (fig. 1). Except as otherwise noted, the collections on which the present paper is based were made in the southeastern portion of the State Park, where a system of marked foot trails has been established, and in the main tract of the Natural Area, located immediately east of the State Park. This study area, which contains about 500 acres, is located in Brown Township, Montgomery County, Indiana.

The lands included in the study area are mostly forested, although a small portion of the area is occupied by recently abandoned farm land and mowed fields and lawns. The upland forests are of a mixed deciduous type in which beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), tulip tree (*Liriodendron tulipifera*), white oak (*Quercus alba*), and red oak (*Q. rubra*) are the outstanding components. White pine (*Pinus strobus*) occurs

¹ Emeritus Professor, Department of Botany, State University of Iowa.

² Consultant in Ecology, Kalbfleisch Field Research Station, the American Museum of Natural History; Department of Botany and Plant Pathology and Institute of Polar Studies, the Ohio State University.

³ On October 15, 1961, the Board of Governors of the Nature Conservancy presented the Pine Hills Natural Area to the State of Indiana. The natural area is now a part of Shades State Park. Covenants attached to the deed, as well as Indiana statutes governing the use of state park lands, assure that Pine Hills will be maintained in perpetuity as a wilderness area.

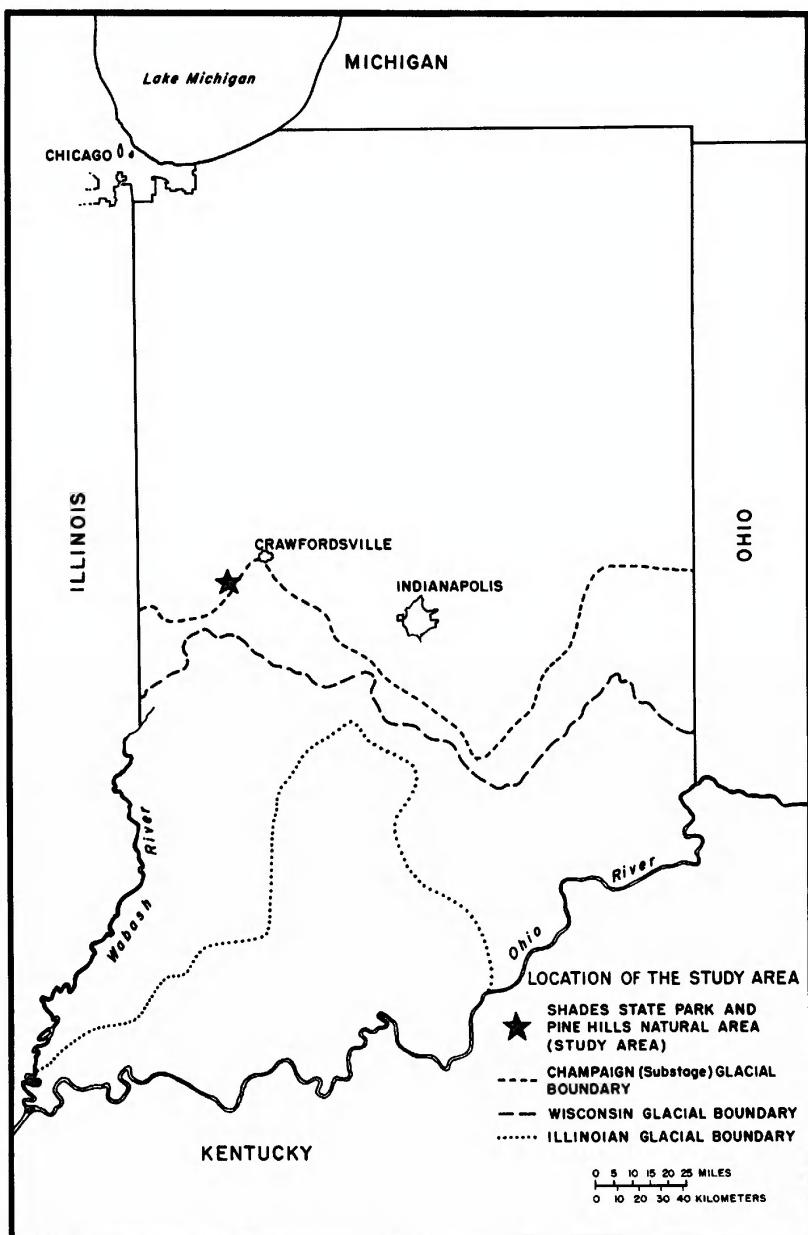


FIG. 1. Outline map of Indiana, showing the location of Shades State Park and Pine Hills Natural Area and their relation to the glacial boundaries.

along cliff edges and in mixed stands with hemlock (*Tsuga canadensis*), particularly on abandoned stream terraces and a few north-facing slopes. The flood plains of the larger streams are covered by relatively dense stands of sycamore (*Platanus occidentalis*), cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*), basswood (*Tilia americana*), white elm (*Ulmus americana*), and several other species.

Although slime fungi were found in many habitats in the study area, they were most abundant, in both individuals and species, in forested sites, particularly in moist habitats along ravine bottoms and on stream flood plains. With the exception of *Mucilago spongiosa*, *Craterium aureum*, *Didymium squamulosum*, and *Diderma testaceum*, which were found only on leaves, all species of Myxomycetes collected during this study were found on decaying logs and stumps. *Fuligo septica*, *Stemonitis fusca*, *Comatricha flaccida*, *Arcyria cinerea*, and *A. denudata* were also found less frequently on other substrates. The fact that decaying logs and stumps form the optimum habitat for these plants (and probably for a great many other fungi, as well as many animals) should be recognized in the management of the properties. The removal of such materials for use as firewood or merely to "clean up" an area should be prohibited.

The collections for this report were made during the summers of 1949, 1950, and 1951 under the auspices of the Indiana Department of Conservation, Division of State Parks, while the junior author served as resident naturalist in Shades State Park. Additional records were obtained from specimens in the herbarium of Wabash College, Crawfordsville, Indiana, which were collected by H. C. Greene and A. R. Bechtel, and were lent through the courtesy of Dr. Richard A. Laubengayer. All specimens were determined by the senior author and now are on deposit in the herbarium of Wabash College.

MYXOMYCETES COLLECTED IN SHADES STATE PARK AND PINE HILLS NATURAL AREA AND KNOWN DISTRIBUTION OF SPECIES IN INDIANA

The nomenclature employed in the following list and the arrangement of entities are adopted from the work of Macbride and Martin (1934). For those entities that have been revised since 1934, the more recent name is used, and the name given by Macbride and Martin (1934) is cited as a synonym. All references to distributions mentioned in the annotations are listed in the Annotated Bibliography on Indiana Myxomycetes. Additional references are included in the list of other literature cited.

SUBCLASS EXOSPOREAE

Ceratiomyxa fruticulosa (Müller) Macbride

Forms with white and yellow sporophores were found on rotting wood. Previously reported from Clark (Gray, 1936), Monroe (Van Hook, 1921), Montgomery (Olive, 1898; Thomas, 1901), St. Joseph (Barbazette, 1909), and Vigo (Underwood, 1894) counties.

Ceratiomyxa fruticulosa var. *arbuscula* Berkeley and Broome

Although this variety and several others commonly are recognized, they merge one into the other by imperceptible degrees and probably are not sufficiently distinct for recognition. However, they are listed here because of their use by previous authors in discussions of distribution in Indiana.

On rotting wood. Previously reported from Clark County (Gray, 1936).

Ceratiomyxa fruticulosa var. *porioides* Albertini and de Schweinitz

On rotting wood. Previously reported from Kosciusko County (Mutchler, 1903).

SUBCLASS MYXOGASTRES

ORDER PHYSARALES

FAMILY PHYSARACEAE

Fuligo septica (Linnaeus) Wiggers

On rotting wood and lawn grass. Previously reported from Brown (Van Hook, 1930), Clark (Gray, 1936), Kosciusko (Mutchler, 1903), Monroe (Mutchler, 1902; Van Hook, 1912, 1930), Montgomery (Olive, 1898), Putnam (Underwood, 1894), St. Joseph (Barbazette, 1909), and Vermillion (Underwood, 1894) counties.

Physarum penetrale Rex

On rotting wood, collected by H. C. Greene and A. R. Bechtel in 1929. Previously reported from Clark County (Gray, [1948]).

Physarum globuliferum (Bulliard) Persoon

On rotting wood. Previously reported from Clark (Gray, 1936), Kosciusko (Mutchler, 1903), and Montgomery (Thomas, 1901) counties.

Physarum murinum Lister

On rotting wood. Not reported previously from Indiana.

Physarum flavicomum Berkeley

On rotting wood. Not reported previously from Indiana.

Physarum nutans Persoon

On rotting wood. Previously reported from Clark (Gray, 1936), Kosciusko (Mutchler, 1903), and Montgomery (Olive, 1898) counties.

Physarum viride (Bulliard) Persoon

On rotting wood. Previously reported from Clark (Gray, 1936), Kosciusko (Mutchler, 1903), and Montgomery (Olive, 1898) counties.

Craterium aureum (Schumacher) Rostafinski

On a dead leaf of *Fagus grandifolia*, collected by H. C. Greene in 1929. Not reported previously from Indiana.

FAMILY DIDYMIACEAE

Mucilago spongiosa (Leysser) Morgan

On living leaves of *Dactylis glomerata* and *Hieracium* sp. Previously reported from Kosciusko (Mutchler, 1903), Monroe (Van Hook, 1916), and Montgomery (Olive, 1898) counties.

Didymium squamulosum (Albertini and de Schweinitz) Fries

On a dead leaf of *Quercus alba*, collected by H. C. Greene and A. R. Bechtel in 1930 from the Fountain County section of the State Park. Previously reported from Montgomery (Olive, 1898) and St. Joseph (Barbazette, 1909) counties.

Diderma testaceum (Schrader) Persoon

On a dead leaf of *Quercus* sp., collected by H. C. Greene and A. R.

Bechtel in 1928. Previously reported from Clark (Gray, 1939), Montgomery (Olive, 1898), and St. Joseph (Barbazette, 1909) counties.

ORDER STEMONITALES

FAMILY STEMONITACEAE

Stemonitis fusca Roth

On mosses and rotting wood. Previously reported from Clark (Gray, 1936), Kosciusko (Mutchler, 1903), Monroe (Mutchler, 1902; Van Hook, 1912), Montgomery (Olive, 1898), St. Joseph (Barbazette, 1909), and Vermillion (Underwood, 1894) counties.

Stemonitis splendens Rostafinski

On rotting wood. Previously reported from Clark (Gray, 1936), De Kalb (Van Hook, 1926), Hamilton (Van Hook, 1930), Kosciusko (Mutchler, 1903), Monroe (Mutchler, 1902; Van Hook, 1916), and Montgomery (Olive, 1898; Whetzel, 1902) counties.

Stemonitis axifera (Bulliard) Macbride

On rotting wood. Previously reported from Clark (Gray, 1936), Monroe (Mutchler, 1902; Van Hook, 1912), Montgomery (Olive, 1898; Whetzel, 1902), and Vermillion (Underwood, 1894) counties.

Stemonitis smithii Macbride

On rotting wood. Previously reported from Clark (Gray, 1936), Kosciusko (Mutchler, 1903), Monroe (Van Hook, 1912), and Montgomery (Thomas, 1901; Whetzel, 1902) counties.

Comatricha flaccida (Lister) Morgan

On rotting wood and a dead leaf of *Fagus grandifolia*, collected by H. C. Greene in 1929 and A. R. Bechtel in 1940. Not reported previously from Indiana.

In the second edition of the Lister monograph (Lister, 1911), Gulielma Lister reduced *Comatricha flaccida* Morgan to *Stemonitis splendens* var. *flaccida* (Morgan) G. Lister. This was repeated in the third edition (1952)

and by Hagelstein (1944). Our specimens do not suggest close relationship with *S. splendens*. They are very similar to *C. longa* in general aspect as in the capillitium, but have shorter, more delicate sporangia and ferruginous, minutely warted spores; the spores of *C. longa* are somewhat larger, much darker, and reticulated. *Comatricha flaccida*, therefore, appears to be a distinct species.

FAMILY LAMPRODERMACEAE

Lamproderma arcyrionema Rostafinski

On rotting wood, collected by H. C. Greene and A. R. Bechtel in 1929 and A. R. Bechtel in 1938. Previously reported from Clark (Gray, 1936), Montgomery (Thomas, 1901), and St. Joseph (Barbazette, 1909) counties.

ORDER LICEALES

FAMILY CIBRARIACEAE

Cibraria sp.

On rotting wood. Collection too fragmentary to permit specific identification.

Dictyidium cancellatum (Batsch) Macbride

On rotting wood. Previously reported from Clark (Gray, 1936), Kosciusko (Mutchler, 1903), Monroe (Mutchler, 1902; Van Hook, 1912), Montgomery (Olive, 1898), St. Joseph (Barbazette, 1909), and Vermilion (Underwood, 1894) counties.

FAMILY TUBIFERACEAE

Tubifera ferruginosa (Batsch) Gmelin

On rotting wood. Previously reported from Clark (Gray, 1939), Kosciusko (Mutchler, 1903), Monroe (Van Hook, 1922), and Montgomery (Olive, 1898) counties.

Tubifera microsperma (Berkeley and Curtis) Martin

On rotting wood. Previously reported from Clark (Gray, 1939),

Kosciusko (Mutchler, 1903; Gray, 1939), and Vermillion (Underwood, 1894) counties as *Tubifera stipitata* (Berkeley and Ravenel) Macbride or *T. cylindrica* (Bulliard) De Candolle.

FAMILY LYCOGALACEAE

Lycogala epidendrum (Linnaeus) Fries

On rotting wood. Previously reported from Clark (Gray, 1936), Kosciusko (Mutchler, 1903), Monroe (Underwood, 1894; Van Hook, 1935), Montgomery (Olive, 1898; Van Hook, 1912), Posey (Van Hook, 1930), Putnam (Underwood, 1894), and St. Joseph (Barbazette, 1909) counties.

ORDER TRICHIALES

FAMILY ARCYRIACEAE

Arcyria nutans (Bulliard) Greville

On rotting wood. Previously reported from Clark (Gray, 1939), Kosciusko (Mutchler, 1903), Monroe (Mutchler, 1902), and Montgomery (Olive, 1898) counties.

Arcyria incarnata Persoon

On rotting wood. Previously reported from Kosciusko (Mutchler, 1903), Monroe (Mutchler, 1902; Van Hook, 1916), and Montgomery (Thomas, 1901) counties.

Arcyria cinerea (Bulliard) Persoon

On rotting wood, soil, and a dead leaf of *Quercus rubra*. Previously reported from Clark (Gray, 1936), Kosciusko (Mutchler, 1903), Monroe (Mutchler, 1902), Montgomery (Olive, 1898; Thomas, 1901), St. Joseph (Barbazette, 1909), and Vermillion (Underwood, 1894) counties. The digitate form, formerly known as *Arcyria digitata* (de Schweinitz) Rostafinski, was found on rotting wood and moss. It has been reported from Clark (Gray, 1936), Kosciusko (Mutchler, 1903), Monroe (Mutchler, 1902), Montgomery (Thomas, 1901), and St. Joseph (Barbazette, 1909) counties.

Arcyria denudata (Linnaeus) Wettstein

On rotting wood and soil. Previously reported from Clark (Gray, 1936), Kosciusko (Mutchler, 1903), Monroe (Mutchler, 1902), Montgomery (Olive, 1898), Putnam (Underwood, 1894), St. Joseph (Barbazette, 1909), and Vermillion (Underwood, 1894) counties.

FAMILY TRICHIACEAE

Oligonema schweinitzii (Berkeley) Martin

On rotting wood. Previously reported from Monroe (Mutchler, 1902; Van Hook, 1912), Montgomery (Olive, 1898), and Wabash (Mutchler, 1903) counties as *Oligonema nitens* (Libert) Rostafinski.

Hemitrichia serpula (Scopoli) Rostafinski

On rotting wood, collected by A. R. Bechtel in 1928 from Pine Hills in Montgomery County and by H. C. Greene and A. R. Bechtel in 1930 from the Fountain County section of the State Park. Previously reported from Clark (Gray, 1939); Kosciusko (Mutchler, 1903), Montgomery (Olive, 1898), and St. Joseph (Barbazette, 1909) counties.

Hemitrichia vesparium (Batsch) Macbride

On rotting wood. Previously reported from Clark (Gray, 1936), Kosciusko (Mutchler, 1903), Monroe (Mutchler, 1902; Van Hook, 1912), Montgomery (Olive, 1898; Thomas, 1901), Putnam (Underwood, 1894), St. Joseph (Barbazette, 1909), and Vermillion (Underwood, 1894) counties.

Hemitrichia clavata (Persoon) Rostafinski

On rotting wood, collected by A. R. Bechtel in 1949. Previously reported from Kosciusko (Mutchler, 1903), Monroe (Mutchler, 1902; Van Hook, 1912), Montgomery (Olive, 1898), Putnam (Underwood, 1894, 1895), and St. Joseph (Barbazette, 1909) counties.

Hemitrichia stipitata (Massee) Macbride

On rotting wood, collected by H. C. Greene and A. R. Bechtel in

1930 from the Fountain County section of the State Park and during the present study from the Montgomery County section. Previously reported from Kosciusko (Mutchler, 1903), Monroe (Van Hook, 1912), and Vermillion (Underwood, 1894) counties.

In their monographs, Lister (1925) and Hagelstein (1944) included this species in *Hemitrichia clavata*. Both species are common in temperate North America, and *H. stipitata*, but not *H. clavata*, is common in the tropics. They are readily distinguished in the field by the naked eye, and the macroscopic aspect is consistently correlated with microscopic differences, especially in the capillitium.

SUMMARY

Collections of Myxomycetes were made in Shades State Park and Pine Hills Natural Area, Montgomery County, Indiana, during the summers of 1949, 1950, and 1951. These and earlier collections from the properties contained 34 entities, including 31 species, two varieties, and one specimen that was determined only to genus. Four of the species collected in Montgomery County, *Physarum murinum*, *P. flavidum*, *Craterium aureum*, and *Comatricha flaccida*, have not been reported previously from Indiana. Three other species and two varieties represent additional records from Montgomery County (*Ceratiomyxa fruticulosa* var. *arbuscula*, *C. f.* var. *porioides*, *Physarum penetrale*, *Tubifera microsperma*, and *Hemitrichia stipitata*), and three species represent the first Myxomycetes reported from Fountain County (*Didymium squamulosum*, *Hemitrichia serpula*, and *H. stipitata*).

ANNOTATED BIBLIOGRAPHY OF INDIANA MYXOMYCETES

BARBAZETTE, L.

1909. Tentative list of Myxomycetes of northern Indiana and southern Michigan. Amer. Midland Nat., vol. 1, pp. 38-43.
Includes a list of 34 species from St. Joseph County with data on place of collection, date, and abundance.

GRAY, WILLIAM D.

1936. Myxomycetes of Clark County, Indiana. Proc. Indiana Acad. Sci., vol. 45 (1935), pp. 69-73.
Lists 34 species, with annotations on substrate, locality, and date of collection.

1938. A note on *Stemonitis fusca* Roth. *Ibid.*, vol. 47 (1937), pp. 86-87.
Description of fairy-ring formation by the species, with notes on the habitats and phenology of *S. fusca* and *S. axifera*, without mention of specific localities.

1939. Myxomycetes of Clark County, Indiana, II. *Ibid.*, vol. 48 (1938), pp. 71-73.
 An alphabetical list of 27 species with occasional notes on substrate.

[1948.] Myxomycetes new or rare in Indiana. *Ibid.*, vol. 57 (1947), pp. 69-73.
 An alphabetical list of 22 species from Clark, Decatur, Floyd, Harrison, Jasper, Marshall, Montgomery, Orange, Putnam, Ripley, Scott, and Washington counties, with citations of previous collections and scattered data on substrate.

HAGELSTEIN, ROBERT
 1939. Notes on the Mycetozoa—III. *Mycologia*, vol. 31, pp. 337-349.
 Report of *Lycogala conicum* from Decatur County.

MACBRIDE, THOMAS HUSTON, AND GEORGE WILLARD MARTIN
 1934. The Myxomycetes, a descriptive list of the known species with special reference to those occurring in North America. New York, the Macmillan Co., xi + 339 pp.
Stemonitis nigrescens is cited specifically from Indiana, without definite locality. The general range given for many other species includes Indiana.

MUTCHLER, FRED
 1902. A collection of Myxomycetes. *Proc. Indiana Acad. Sci.*, for 1901, pp. 291-292.
 An unannotated list of 38 species collected near Bloomington, Monroe County, in October, 1901.

1903. Myxomycetes of Lake Winona. *Ibid.*, for 1902, pp. 115-120.
 A list of 86 species from Kosciusko County, with annotations on substrate, locality, and date of collection.

OLIVE, EDGAR WILLIAM
 1898. A list of Mycetozoa collected near Crawfordsville, Indiana. *Proc. Indiana Acad. Sci.*, for 1897, pp. 148-158.
 An unannotated list of 43 species from Montgomery County.

THOMAS, M. B.
 1901. Cryptogamic collections made during the year. *Proc. Indiana Acad. Sci.*, for 1900, pp. 121-123.
 An unannotated list of 30 species from Montgomery County.

UNDERWOOD, LUCIEN M.
 1894. List of cryptogams at present known to inhabit the State of Indiana. Myxomycetes. *In his Report of the Botanical Division of the Indiana State Biological Survey. Proc. Indiana Acad. Sci.*, for 1893, pp. 30-31.
 An unannotated list of 21 species from Putnam, Tippecanoe, Vermillion, and Vigo counties.

1895. Report of the Botanical Division of the Indiana State Biological Survey for 1894. *Ibid.*, for 1894, pp. 144-176.
 Includes an unannotated list of four species from Grant, Putnam, and Tippecanoe counties.

VAN HOOK, J. M.
 1912. Indiana fungi—II. *Proc. Indiana Acad. Sci.*, for 1911, pp. 347-354.
 An alphabetical list of 21 species from Brown, Monroe, and Montgomery counties, with date of collection and occasional notes on substrate.

1916. Indiana fungi—III. *Ibid.*, for 1915, pp. 141–148.
An alphabetical list of 10 species from Brown and Monroe counties, with annotations on substrate, locality, and date of collection.

1921. Indiana fungi—V. *Ibid.*, for 1920, pp. 209–214.
An alphabetical list of three species from Monroe County, with annotations on substrate, locality, and date of collection.

1922. Indiana fungi—VI. *Ibid.*, for 1921, pp. 143–148.
Report of *Tubifera ferruginosa* from Monroe County, with data on locality, substrate, date of collection, and abnormalities.

1924. Indiana fungi—VII. *Ibid.*, vol. 33 (1923), pp. 233–238.
Report of *Physarum nefroideum* from Monroe County, with notes on substrate and date of collection.

1926. Indiana fungi—IX. *Ibid.*, vol. 35 (1925), pp. 233–236.
Report of *Stemonitis morgani* from Benton County, with notes on substrate and date of collection.

1930. Indiana fungi, XII. *Ibid.*, vol. 39 (1929), pp. 75–83.
An alphabetical list of four species from Brown, Hamilton, Monroe, and Posey counties, with annotations on substrate and date of collection.

1935. Indiana fungi, XIII. *Ibid.*, vol. 44 (1934), pp. 55–64.
Report of *Lycogala epidendrum* from Monroe County, with notes on substrate and date of collection.

WHETZEL, H. H.

1902. Notes on the genus *Stemonitis*. *Proc. Indiana Acad. Sci.*, for 1901, pp. 261–266.
Descriptions of six known and one unknown species from the vicinity of Crawfordsville, Montgomery County.

OTHER LITERATURE CITED**HAGELSTEIN, ROBERT**

1944. The Mycetozoa of North America, based upon the specimens in the herbarium of the New York Botanical Garden. Mineola, New York, published by the author, 306 pp.

LISTER, ARTHUR

1911. A monograph of the Mycetozoa. Second edition, revised by Gulielma Lister. London, British Museum (Natural History), 302 pp.

1925. A monograph of the Mycetozoa. Third edition, revised by Gulielma Lister. London, British Museum (Natural History) and Oxford University Press, xiii + 296 pp.